Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/002645

International filing date: 31 January 2005 (31.01.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/540,784
Filing date: 31 January 2004 (31.01.2004)

Date of receipt at the International Bureau: 17 March 2005 (17.03.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

1293621

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 08, 2005

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: ***60/540,784***
FILING DATE: ***January 31, 2004***
RELATED PCT APPLICATION NUMBER: ***PCT/US05/02645***

UNITED STATES PATENT AND TRADEMARK OFFICE
DEPARTMENT OF COMMERCE

Certified by

Jon W. Dudas

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

15540 U.S.PTO
013104

PTO/SB/16 (01-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EV218273328US

22151 U.S. PTO
60/540784
013104

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Richard J.	Bailey	Kailua-Kona, HI

Additional inventors are being named on the ______ *separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☐ Customer Number:

OR

☒ Firm or Individual Name	Michael R. McKenna				
Address	500 W. Madison, Ste 3800				
Address					
City	Chicago	State IL	IL	Zip	60661
Country	US	Telephone 312	321-0123	Fax 312	876-2020

ENCLOSED APPLICATION PARTS ***(check all that apply)***

☒ Specification *Number of Pages* 9

☒ Drawing(s) *Number of Sheets* 2 (3 Figs)

☐ Application Data Sheet. See 37 CFR 1.76

☐ CD(s), Number ______

☒ Other (specify) Declaration/Power Of Attorney; Express Mail Postcard & Cert.

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees.

☒ The Director is herby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 13-0479

☒ Payment by credit card. Form PTO-2038 is attached.

FILING FEE Amount ($): 80-

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☐ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: ______

Respectfully submitted,

SIGNATURE [signature]

TYPED or PRINTED NAME Michael R. McKenna

TELEPHONE 312/321-0123

Date 1/31/04

REGISTRATION NO. 32,368
(if appropriate)
Docket Number: ______

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

CERTIFICATE OF MAILING
BY EXPRESS MAIL

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail No.EV218273328 US in an envelope addressed to Mail Stop Provisional Application, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on January 31, 2004.

Date: 1/31/2004 Signed: Ruth Zoh Leib

A

PROVISIONAL APPLICATION

Submitted by

Richard J. Bailey

For

An Improved Condensation System

Inventor:

Richard G. Bailey

An Improv d Condensation System

An improved condensation system for producing potable water in which a heat exchanger supplied with cold water, preferably deep ocean water, is disposed in a flow of humid air to condense potable water from the humid air, wherein the improvement comprises means for moderating the humidity of the humid air, condensation rate, and water quality of the condensation system.

The means for moderating the humidity of the humid air, condensation rate, and water quality of the condensation system may comprise a positive air pressure dome system having a sheeting cover supported by the positive air pressure. See Figure 2. The positive air pressure is supplied by at least one air fan, the sheeting cover is free of contact with the heat exchanger contained therein, and the sheeting cover is secured to the ground at its peripheral edge. Whereby, the positive pressure within the dome system can be enhanced to increase the condensation rate and air borne water contaminants can be reduced within the dome system. Utilizing a sheeting system allows for expansion of and the ability to cover a number of additional heat exchangers which can be disposed laterally at the same elevation and still be kept under the dome system.

In a preferred embodiment, the at least one air fan is a ducted air fan humidifier, in which the humidity levels within the dome system can be enhanced to increase the condensation rate.

Moreover, the means for moderating the humidity of the humid air, condensation rate, and water quality of the condensation system may further comprise at least one continuous coil looped over a coil support structure that is disposed in the flow of humid air to condense additional potable water from the humid air. See Figure 3. The at least one continuous coil is supplied with cold water discharging from the heat exchanger. The at least one continuous coil may be loosely looped over a coil support structure. Additionally, the means for moderating the humidity of the humid air, condensation rate, and water quality of the condensation system further may comprise means for vibrating the at least one continuous coil.

Furthermore, the means for moderating the humidity of the humid air, condensation rate, and water quality of the condensation system may further comprise means for vibrating the heat exchanger to enhance the condensation rate.

The improved condensation system of this important invention may further comprise means for moderating the cold water transported through the heat exchanger based on the temperature of the cold water discharging form the heat exchanger. Specifically, the means for moderating the cold water transported through the heat exchanger may comprise an inlet reservoir for receiving cold water, an outlet reservoir for receiving the cold water discharged from the heat exchanger, and each of the inlet reservoir and the outlet reservoir containing a volume of cooling water having an inlet upper level and an outlet upper level, respectively. See Figure 1 below. The inlet upper level may be maintained by at least one float valve which controls the volume of cold water entering the inlet reservoir, the outlet upper level is controlled by at least one moveable weir, and a cold water circuit may extend from the inlet reservoir through the heat exchanger to the outlet reservoir, the inlet end of the cold water circuit is disposed below the inlet upper level, and the outlet end of the cold water circuit is disposed below the outlet upper level. Means for measuring the temperature of the cooling water at the outlet end of the water circuit and producing a signal to control movement of the at least one moveable weir in response to the temperature. In this way, a regulated flow of cold water is siphoned through the water circuit by a vacuum created when the at least one moveable weir is lowered bringing down the outlet upper level in the outlet reservoir in response to the temperature of the cold water at the outlet end of the water circuit. Preferably, each of the inlet reservoir and the outlet reservoir is unpressurized.

Background

U. S. Patent No. 5,675,938 issued in 1997 to McLorg for a desert envitalization system with variable volume pneumatic polydome enclosure discloses an inflatable enclosure for condensing and collecting water vapor from solar heated seawater. The pneumatic enclosure is maintained at a positive pressure by an inflation fan. The '938 patent collects condensate that is plumbed to a ballast system which helps hold up the dome during the nighttime; it does not produce condensate for drinking water, nor does it protect a fluid condenser. It is a closed hydrological system whereas the instant invention is open but internally pressurized.

U.S. Patent No. 6,440,275 issued in 2002 to Domen for solar stills for producing fresh water uses an inflatable bladder system. Domen's solar still does not use a heat exchanger employing cold water and has a closed environment where as the instant invention is a positive pressure but open environment.

Further see U.S. Patent No. 4,956,936 issued to Sprung in 1990 for a method and system for purification of water for greenhouse structures which teaches a device and method for the generation and subsequent condensation and collection of water vapor within the volume of a greenhouse. The '936 patent teaches only water production for irrigation to plants and the water produced is not collected via internal heat exchanger and unlike the instant invention Sprung provides a closed environment system.

Also see U.S. Patent No. 4,741,123 issued to Gauthier in 1988 for a greenhouse equipped with a watering system which captures and distributes condensate water from the morning and evening dews. The '123 patent is used for watering plants only and not for potable, commercial, or industrial water production. Additionally, it is not related to the use of a heat exchanger system.

Additionally, see U.S. Patent No. 3,498,077 issued in 1970 to Gerard et al. For an atmospheric water recovery method and means for obtaining potable water from atmospheric air, wherein cold deep seawater is pumped through a condenser that reacts with humid air to produce condensate potable water that is collected in a reservoir. The '077 patent does not use a controlled environment to condense water vapor and does not teach the use of a dome to control aerial contamination of the freshwater produced nor does it regulate deep sea water temperature or flow through the heat exchanger of condensers.

Design Patent D363,993 issued in 1995 to Johnson et al. for an inflatable shelter. The '993 dome is not used for the production of freshwater nor does it indicate an air-flow pressurized system for inflation.

Also see U.S. Patent Nos. 4,418,549 and 4,351,651 issued in 1983 and 1982 respectively to Courneya each comprises an apparatus for extracting potable water from moisture laden air.

Further see U.S. Patent No. 5,149,446 issued in 1992 to Reidy for a potable water generator whereby air is directed over condenser coils to creating condensate on the coils that is channeled into a collection container. The '446 patent does not use a dome structure or positive pressure environment. Additionally, the unit shuts off when humidity levels fall to low to condense water vapor at dew point, whereas the instant invention can run continuously.

U.S. Patent No. 6,574,979 issued to Faqih in 2003 for production of potable water and freshwater needs for human, animal and plants from hot and humid air discloses a system for extracting freshwater from atmospheric humidity, wherein the system includes cooling coils in which warm air is passed over thereby producing condensate that drips by gravity into a freshwater storage tank. The '979 patent does not use a thermal regulation device to control the heat exchanging fluid temperature of flow rates through the condenser nor does it use a control positive air pressure environment (dome).

Additionally, see International Application Number PCT/US99/24800; International Publication No. WO 00/24487, filed 22 October 1999 on behalf of Malson et al. for a water condensation system comprising a water vapor container, a condenser with a low temperature liquid flowing through and a collection trough located underneath the condenser, whereby condensate is gravitationally collected as it sweats off the condenser. The instant invention is not a closed environment. Airflow is regulated on the outside port to maintain a positive pressure environment to support the enclosure and vapor condensing.

U.S. Pat 1,816,592, issued in 1927 to Knapen is a means to recuperate the atmospheric moisture and describes dome-like mortar or stone structure 2-3 meters in thickness with holes which allows moisture and condenses the moisture at nigh on the inside surface of the structure. It does not provide for enhanced water quality and has no heat exchanger involved; no positive pressure or controlled atmospheric environment and does not produce filtered water.

U..S. Pat. 4,383,891 issued in 1983 to Clavier for a device for desalting brackish water, and a conditioning method and device relating to said desalting device. This device desalinates brackish water using solar energy and conditioning the atmosphere of a greenhouse for plant production. The '891 patent desalinates seawater and not atmospheric vapor condensation and conditions air for green house plants whereas the instant invention is used to produce potable water. In the '891 patent there is no internal air-to-fluid heat exchanger/condenser.

U.S. Pat. 6,274,004 issued to Andersen in 2001 is a water purification device using greenhouse structures holding

seawater and collecting the water vapor in a condenser. 'The 004 patent is geared toward water purification and not new water production; the condenser unit is outside of the greenhouse and it is not a positive environment. The citation of the foregoing publications is not an admission that any particular publication constitutes prior art, or that any publication alone or in conjunction with others, renders unpatentable any pending claim of the present application. None of the cited publications is believed to detract from the patentability of the claimed invention.

Advantages of the present invention.

1. **Thermal Control Parallel Trough Siphon System:**

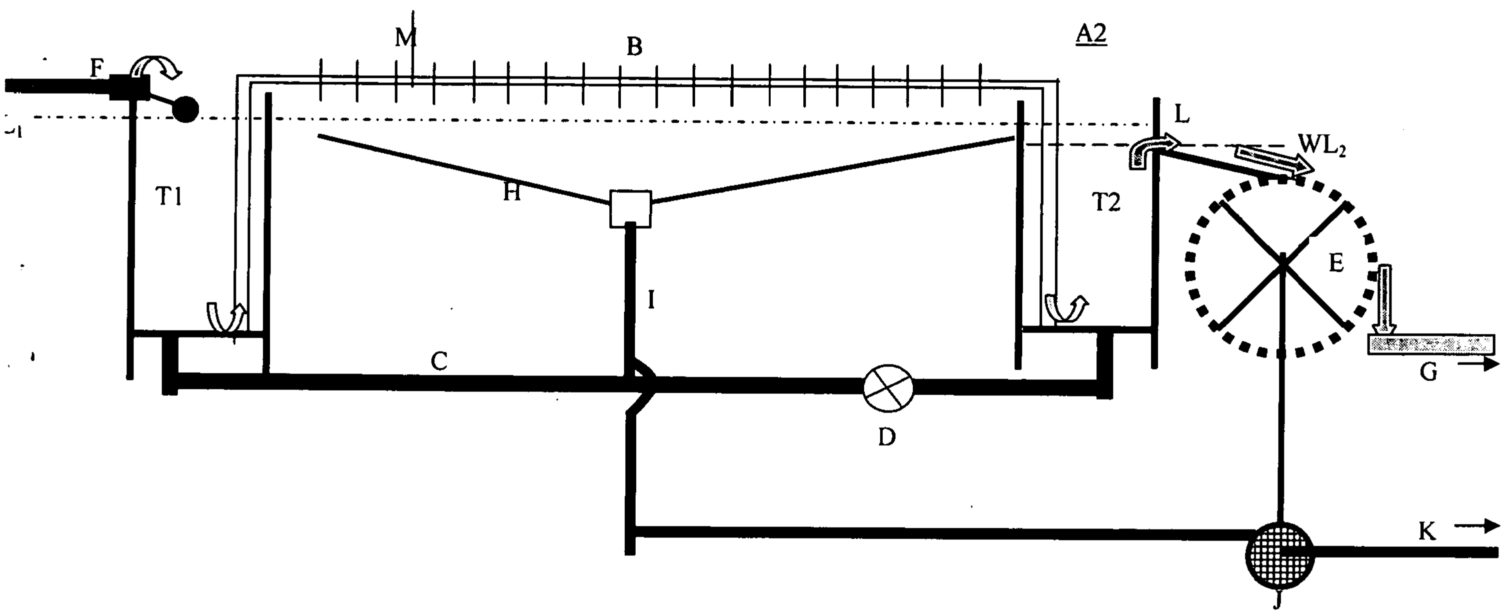
Function:

Regulates the temperature and flow rate of the heat exchanging fluid evenly to multiple parallel heat exchangers by using a variable height two-trough reservoir system.

Benefit:

System allows linear expansion, has no plumbing fittings for each condenser, and regulates flow rate and thus heat exchanger fluid temperature for each heat exchanger simultaneously.

Figure 1. Thermal Control Parallel Trough Siphon/Pump System



Legion:

A1	Incoming Heat Exchanger Fluid Trough
T1	Temperature of Heat Exchanging Fluid (<50°F, 10°C)
B	Multiple Parallel Heat Exchanger Tubes
A2	Discharge Heat Exchanger Fluid Trough
T2	Temperature of Heat Exchanging Fluid (>50°F, 10°C)
C	Water Level Equalizer
D	Equalizer Valve
E	Water Wheel Drive
F	Incoming Heat Exchanger Fluid Float Valve
G	Discharge Heat Exchanger Fluid
H	Condensation collector
I	Condensation Line out
J	Condensate Pump
K	Pumped Condensate Line Out
L	Adjustable weir gate
M	Vibration device

WL_1 Incoming Heat Exchanger Fluid Level
WL_2 Discharge Heat Exchanger Fluid Level (Regulated)

Operation:

1. Heat Exchanging Fluid (<50°F, 10°C or sub-dew point temperature) enters **A1** (Incoming Trough) at **F** (float valve regulator). Equalizer valve **D** is in the open position, which allows the heat exchanging fluid to equalize **C** in depth in the parallel trough **A2**. Once **A1** and **A2** reach maximum level the float valve will stop incoming fluid. At this point the equalizer valve **D** is closed.
2. Once troughs **A1** and **A2** are full to equal fluid level the heat exchanging tubes are evacuated of air and filled with the heat exchanging fluid and set into place linking trough **A1** and **A2** by a siphon bridge.
3. Once weir gate **L** is lowered below the water level **WL_1 to WL_2**, the heat-exchanging fluid will flow out of **A2** down a shoot to the water wheel **E**. Water in A1 will begin to migrate through the heat exchanger tubes to trough **A2** via a siphon.
4. The weir level regulates the heat exchanger fluid flow rate through the heat exchanger tubes. The flow rate also regulates the heat exchangers fluid absorption of heat. After the heat exchanging fluid flow has stabilized fine adjustments in the weir level can be made to tune the desired temperature differential between **A1 (T1)** and **A2 (T2)**.
5. As the heat exchanger fluid passed through the heat exchanger tubing condensate freshwater forms on the outside which is collected as it falls to the condensation collection pan **H** where it is plumbed to a water pump **J.**
6. The heat exchanging fluid exiting **A2** at **L** provides gravity energy to power an overshoot waterwheel that provides drive power to the condensate water pump.
7. The exiting heat exchanger fluid at **G** is then recharged for reuse of exits as effluent.
8. A vibration device **M** is attached to the heat exchanging tubing. The vibration device maybe electrical of hydraulically driven which cyclically vibrates the heat exchanger tubes to reduce condensate surface, allowing the condensate of be stripped off the heat exchanger tubes more quickly and allows for further condensation to occur.

2. Positive air pressure dome environment for condensing water vapor

Function:

Condensing rate increases under positive air pressure conditions.

Benefit:

More freshwater produced. The positive air structure design is a building code approved structure. The structure can be expanded linearly easily.

Operation:

1. A positive pneumatic membrane dome structure will house the fluid to air heat exchanger tube condensers.
2. Air pressure in excess of 1" of water column will maintain the inflated membrane.
3. Air will enter and exit the dome structure and the flow rate will be regulated to maintain the positive pressure environment.
4. Atmospheric moisture entering the dome structure will be removed by condensation on the heat exchanger tubes.

The dome is made of 5 year PVC nylon reinforced sheeting material that will be inflated and supported upward in a linear arc by positive air pressure of approximately 0.036psi (1"water column). Air pressure will be supplied by the ten 0.5 hp incoming ducted air fan humidifiers at a rate of 30-50000cfm (see ducted fan humidifiers). The dome structure is not connected to any of the internal production system components except at its' perimeter base. The dome serves to create an envelope where the environmental humidly levels can be maximized for increased condensation and extraction, while controlling air quality to meet health standards for water source certification. The dome will be anchored to the ground with a concrete perimeter to resist the combined lift of inflation pressure and wind drag. Access to the structure will be through building code approved exit doors that conform to local building

codes for commercial facilities. The doors will located in the middle of the dome and will be a double door air-lock design.

General Description and Operations

Dome Structure:

A commercially available building code approved positive pneumatic dome structure will house the DOW (Deep Ocean Water) condensers (i.e., marine grade stainless steel helical serrated finned tube condensers). The dome will be approximately 60' wide by 15' tall by 300' long (.41 acres). The positive pneumatic dome structure will meet industry standards including Air Structures Design and Standards Manual ASI, ASCE, CSA, CAN-S109, NFPA 701, UBC, and BOCA engineering requirements. The structure will be able to withstand winds in excess of 70mph at a minimum inflation pressure of 1 inch water pressure. At higher inside air pressures winds the structure can withstand winds in excess of 100 mph.

The dome is made of 5 year PVC nylon reinforced sheeting material that will be inflated and supported upward in a linear arc by positive air pressure of approximately 0.036psi (1"water column). Air pressure will be supplied by the ten 0.5 hp incoming ducted air fan humidifiers at a rate of 30-50000cfm (see ducted fan humidifiers). The dome structure is not connected to any of the internal production system components except at its' perimeter base. The dome serves to create an envelope where the environmental humidly levels can be maximized for increased condensation and extraction, while controlling air quality to meet health standards for water source certification. The dome will be anchored to the ground with a concrete perimeter to resist the combined lift of inflation pressure and wind drag.

Access to the structure will be through building code approved exit doors that conform to local building codes for commercial facilities. The doors will located in the middle of the dome and will be a double door air-lock design.

See **Kona RainDome draft Drawings**

3. Thermal Control Parallel Trough Siphon System:

A 12" HDPE main trunk pipeline will supply DOW to the dome. The DOW enters the dome where it is plumbed to a series of (4) 6 " diameter float valves connected to the trough (see drawing). The DOW level is maintained at a height just short of the trough top overflow at 4.5 feet above elevation grade. As the water reaches the set water level in the trough the float valves closes stopping the incoming DOW flow. The trough has two parallel canals that act to remove air bubbles from entering the DOW heat exchangers which can cause airlocks and stop water flow under siphon conditions.

Across the dome is a mirror trough that runs parallel to the incoming DOW trough (see drawing). The DOW water level is set also at 4.5' above grade through a valved u-tube or equalizer pipe that connects the two troughs at the bottom of the troughs. The outgoing DOW trough water level will be regulated by number of weir boards once the equalizer u-tube valve is set to the closed position.

DOW Condenser Design

The DOW condensers rest on top of the two troughs (see drawing). The DOW condenser consist of one thousand 20' X 4" wide 1.5" diameter Sea-Cure ™ Stainless Steel (PREN=42) serrated helical finned tubes (tubing diameter will be determined after research tests). Each tubing will be an inverted "U-tube" having a 90° bend at each end with a 3.5' nipple that will hang vertically into both the DOW incoming and outgoing troughs. The condensers will be approximately no more 3" above the top of each DOW trough wall. The condenser are installed when the DOW trough are at full level. When installed they will be individually evacuated of air to fill each tube condenser with DOW.

Air Flow Deflector

The condenser will be supported in the middle by a suspension brace connected to a series of fiberglass/PVC I beam trusses. The trusses also serve to suspend HDPE sheeting linearly above the condenser that acts a hood to direct the

humid air from atop of the dome structure down to the condensers. A draw draft is also created form the cold heavy air created at the condensers. The air is directed down to the cold air ducts.

Initializing DOW Flow and Regulation

Initializing the DOW flow though the condensers is done by reducing the water level in the outgoing DOW trough which creates a vacuum on condensers which starts DOW water to flowing through condensers, all at an even rate towards the out flow trough. Water flow rate can be used to regulate DOW temperature 55-58°F (ten degrees below dew point temperature). The flow rate thus can be regulated to exactly the amount of DOW needed to produce condensate.

Once the DOW starts flowing through the condensers they will begin to drip freshwater. Data collected from tests in natural outside relative humidly (60%RH) conditions has shown that 80% of the fins on each tube will produce one drop of freshwater every minute. The condensers have 40 fins per foot or 800 fins per 20' condenser tubing length. The tubes independent of each other and can be serviced and cleaned easily. If a tube does fail and develops a pin hole leak, since it is under vacuum pressure it will suck in air and go dry and not produce freshwater, an indication of a problem. Sea water cannot contaminate the freshwater due to a failed condenser.

Condensation Collector

Under the DOW condensers lies a plate of HDPE sheeting which serves as a drip pan collector. The linear sheeting is sloped down towards the center and has a open linear gap of two feet. Below this opening lies another V shaped drip collector pan one foot under it (see drawing). The gap between the top and bottom drip pan collectors allows the cold dry air created when the moisture has been stripped from the humid air as it passed by the cold DOW condenser tubes as it falls because of its cooler temperature and positive air flow pressure generated by the incoming air from the ducted fan humidifiers located along the outside of the long axis of the dome. The air-flow is directed to a exhaust air duct system located at the base under the freshwater collection pans. The exhaust air ducts also regulates inside air pressure to maintain the dome inflation.

The freshwater is collected at the middle of the 300' drip pan trough that slopes to center of the dome from two ends. The freshwater will be plumbed to health approved (6) 5000 gallon holding tanks from which they will be plumbed to filtration system (if needed and to be determined scope based on first DOH water certification analysis) and then to the bottling plant. Solar pumps can be used to raise the water into elevated storage tanks equipped with DOW cooling coils to maintain water freshness.

DOW Vibration Device

The middle condenser support also will be equipped with at vibration device that reduces water surface tension and allows for water to sheet off more quickly. This allows for more water to form on the condenser, increasing condensing rate.

The condensers will also be equipped with a water driven vibration device which will be apart of the truss framework suspended over the condensers. The condenser tubing will be vibrated once per minute to break water tension and increase water production rate.

DOW Driven Water Pump

Additional inside airflow will be powered by water driven wheel gear system. The water drop from the weir dam on the out going DOW trough will be directed over a water wheel which will be geared to overhead fans on a pulley belt drive system. This will increase humid air flow circulation over the condensers at no additional energy cost.

Preliminary Freshwater Production Model Data:

Conditions: 60% RH, 78°F air temperature, dew point of 66°F

Material: Sea-Cure Stainless serrated finned tubular condenser = 40 fins per linear foot

1 condenser = 800 fins (20' condenser)

9' condenser section
80% fins produce one drop per minute (estimated)
DOW flow of 1.0gpm at 50°F(10oC). DOW temperature in 50oF, and DOW temperature out 55oF.
.8 x 800=640 fins = 640 drops per minute per condenser tube
1000 condensers (20' length = 800 fins ea.) = 640,000 drops per minute
1 drop = 0.1cm^3
640,000 X 0.1cm^3 = 64000cm^3 per minute total
64,000 cm^3 = 64 liters/minute (16.9gpm)
64 liters X 1440 minutes =92160 liters or 24348.7 gallons per day

Our model shows that we will exceed the 10000 gallon per day goal if we produce 50% of what the model shows. The production figures based on the scale up of a 1000 gallon per day system will serve to fine tune the number of components and DOW required to produce 10,000 gallons per day freshwater.

Questions still to be answered which will be apart of phase 1.

A 1000 gpd unit will be built and tested on site.

The 1000gpd unit will be incorporated into the 10,000gpd unit as a sectional add-on.

1. Compare different tubing diameters with different surface areas, on initial cost, numbers required for equal production output.
2. What is the minimum air flow required? How does freshwater production rate change with %RH?
3. What is the maximum DSW temperature that can be used so that the systems placement can be better located in terms of DSW usage?
4. What is the best vibration cycle period to use to maximize output drops by reducing surface tension.

Kona RainDome Material Suppliers:

DSW condenser	Kent Fin Tubing
Pneumatic Structure	Yeadon Air Support Structures
HDPE Liner	Pacific Lining Systems
Humidifiers	JS JetSpray
Fans	Granger

Bottling Plant Suppliers

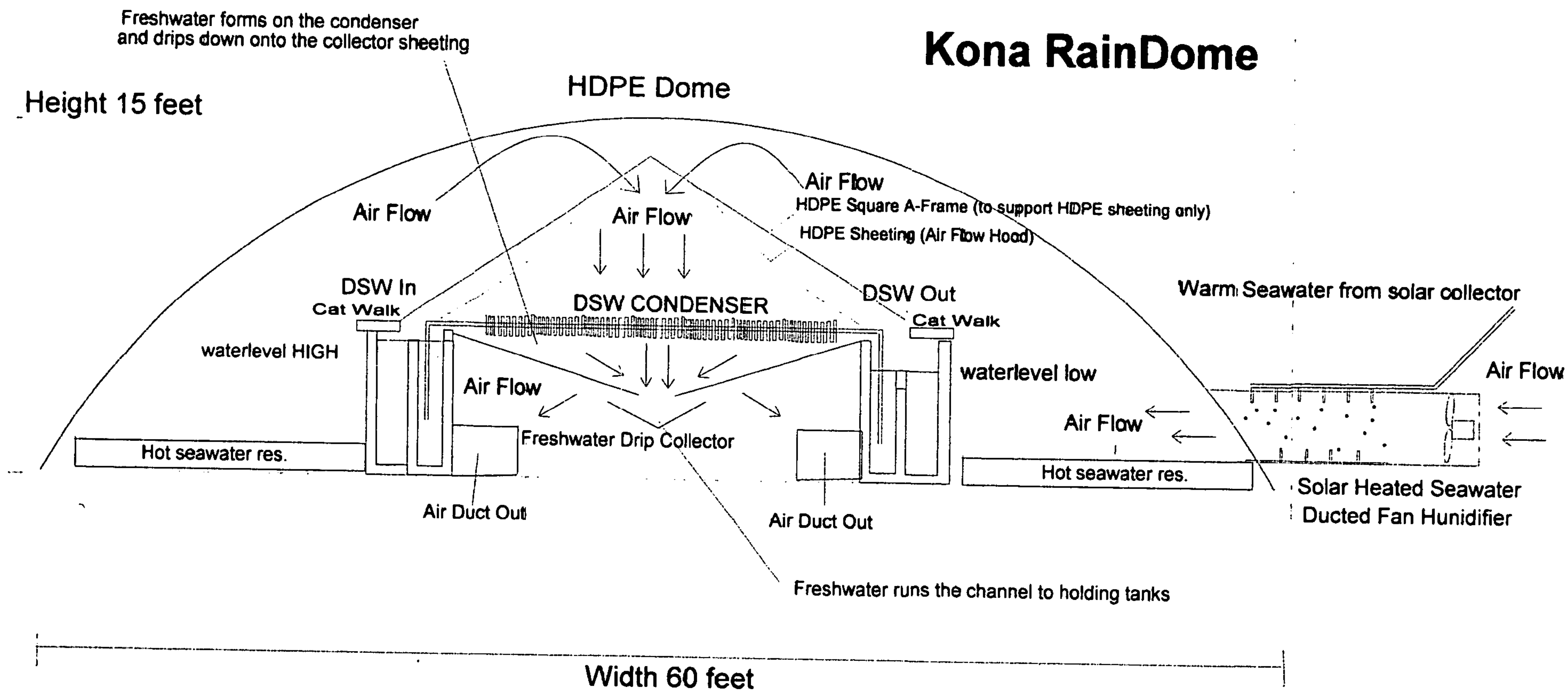
PET blow mold
Inline filler, capper
Pallet rack system
Forklift

Figures 2 and 3 are made a part of disclosure.

ABSTRACT

An improved condensation system for producing potable water comprising a positive air pressure dome system for moderating the humidity of humid air, condensation rate, and water quality, at least one continuous coil looped over a coil support structure that is disposed in the flow of humid air to condense additional potable water from the humid air, means for vibrating the at least one continuous coil and means for vibrating the heat exchanger to enhance the condensation rate, and means for moderating the cold water transported through the heat exchanger with a siphoning system functioning on the basis of the temperature of the cold water discharging form the heat exchanger.

Applicant: Richard J. Bailey
U.S. Serial No: applied for
For: An Improved Condensation System



Crossectional Elevation View
(not to scale)

Figure 3

DECLARATION FOR PATENT APPLICATION
AND POWER OF ATTORNEY

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the invention which is claimed and for which a patent is sought on the invention entitled An Improved Condensation System, the specification of which(check one)

(x) is attached hereto.
( ) was filed on ______________________________as
Application Serial No. ______________________________________
and was amended on ______________________(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration, that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty under 37 CFR §1.56 to disclose information of which I am aware which is material to the examination of this application, that I reviewed and understand the contents of the specification, including the claims, and that no application for patent or inventor's certificate on this invention has been filed by me or my legal representatives or assigns in any country foreign to the United States of America except as identified below for which I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)		Date of Filing	Priority Claimed	
____________	____________	____________________	___	___
(Number)	(Country)	(Day, Month, Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing Date) (Status-patented, pending, abandoned)

(Application Serial No.) (Filing Date) (Status-patented, pending, abandoned)

I hereby appoint MICHAEL R. McKENNA, Reg. No. 32,368, my attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

SEND CORRESPONDENCE TO:

MICHAEL R. McKENNA
500 W. Madison Street, Ste. 3800
Chicago, Illinois 60661-2511

DIRECT TELEPHONE CALLS TO:

MICHAEL R. McKENNA
(312) 321-0123

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon, and I have reviewed and understand the contents of the specification, including the claim.

Sole or First Inventor

Richard J. Bailey
73-1679 Hao St.
Kailua-Kona, Hawaii 96740
Post Office Address: same as above
Citizenship: United States
Inventor's Signature ________ Date 1-30-04